

TRANSMITTAL LETTER OF THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		Attorney Docket No. 4001-1025 U.S. Application No. 10/070824
INTERNATIONAL APPLN. NO. PCT/DE00/02627	INTERNATIONAL FILING DATE 7 AUGUST 2000	PRIORITY DATE CLAIMED 10 SEPTEMBER 1999
TITLE OF INVENTION: ARRANGEMENT AND PROCESS FOR ORGANIZING FLAT ITEMS OF MAIL		
APPLICANT(S) FOR DE/EO/US: PETER BRETSCHNEIDER AND RUDOLF SCHUSTER		
Applicant herewith submits to the United States Designated Elected Office (DO/EO/US) the following items and other information:		
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371 (c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau) b. <input type="checkbox"/> has been communicated by the International Bureau. See attached PCT/IB/308. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made, however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)). <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). 		
Items 11 to 20 below concern document(s) or information included:		
<ol style="list-style-type: none"> 11. <input checked="" type="checkbox"/> Information Disclosure Statement (IDS) w/PTO-1449 - <input checked="" type="checkbox"/> Copy of IDS citations 12. <input checked="" type="checkbox"/> Assignment Papers (cover sheet & document(s)) 13. <input checked="" type="checkbox"/> A FIRST Preliminary Amendment. 14. <input type="checkbox"/> A SECOND or SUBSEQUENT Preliminary Amendment. 15. <input type="checkbox"/> A substitute specification. 16. <input type="checkbox"/> A change of power of attorney and/or address letter. 17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4). 19. <input type="checkbox"/> A second copy of the English language translation of the international application (35 U.S.C. 154(d)(4)). 20. <input checked="" type="checkbox"/> Other items or information: Abstract on a separate sheet and Application Data Sheet, PCT REQUEST (PCT/RO/101) & international application as filed in German, Cover page of international publication, International Preliminary Examination Report (PCT/IPEA/409) & Annexes 		

U.S. APPLICATION NO. 10/070824		INTERNATIONAL APPLN. NO. PCT/DE00/02627		ATTORNEY DOCKET NO. 4001-1025	
21. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1)-(5): Neither international preliminary examination fee nor international search fee paid to USPTO and international Search Report not prepared by the EPO or JPO\$1040.00 International preliminary examination fee not paid to USPTO but International Search Report prepared by the EPO or JPO\$890.00 International preliminary examination fee not paid to USPTO but International search fee paid to USPTO\$740.00 International preliminary examination fee paid to USPTO but all claims did not satisfy provision of PCT Article 33 (1)-(4).....\$710.00 International preliminary examination fee paid to USPTO and all claims satisfied provision of PCT Article 33 (1)-(4).....\$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration than <input type="checkbox"/> 20- <input type="checkbox"/> 30 Months from the earliest claimed priority date (37 CFR 1.492(e))				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	9 - 20 =	0	X \$18.00	\$	
Independent Claims	2 - 3 =	0	X \$84.00	\$	
MULTIPLE DEPEND CLAIM(S) (if applicable)			+ \$280.00	\$	
TOTAL OF ABOVE CALCULATION -				\$ 890.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				+	\$
SUBTOTAL =				\$ 890.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492Z(f)).				\$	
TOTAL NATIONAL FEE =				\$ 890.00	
Fee for recording the enclosed assigned (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) \$40.00 per property +				\$ 40.00	
TOTAL FEES ENCLOSED -				\$ 930.00	
				Amount to be refunded:	\$
				Charged:	\$
<input checked="" type="checkbox"/> A Check in the amount of \$930.00 to cover all fees is attached. <input type="checkbox"/> The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to Deposit account No. 25-0120 in the name of Young & Thompson, as described below. A duplicate copy of this sheet is enclosed. <input checked="" type="checkbox"/> The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fee required under 37 C.F.R. §§ 1.16 or 1.17.					
SEND ALL CORRESPONDENCE TO: 745 South 23 rd Street Arlington, VA 22202 Telephone (703) 521-2297 Y&T Customer No. 000466			SIGNATURE <u><i>Benoit Castel</i></u> Benoit Castel NAME		
BC/lmt Date: 11 MARCH 2002			00466 PATENT TRADEMARK OFFICE 35,041 REGISTRATION NO.		

PATENT
4001-1025

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of: Peter BRETSCHNEIDER et al.

Appl. No.: **NEW NATIONAL PHASE
APPLICATION IN THE
UNITED STATES** Group:

Filed: March 11, 2002 Examiner:

For: ARRANGEMENT AND PROCESS FOR ORGANIZING
FLAT ITEMS OF MAIL

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, DC 20231

March 11, 2002

Sir:

Prior to the first Official Action and calculation of the filing fee, the following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

IN THE SPECIFICATION:

Please substitute pages 1-15 as originally filed, with the substitute specification pages attached hereto.

IN THE CLAIMS:

Please cancel claims 1-18 without prejudice or disclaimer of the subject matter contained therein.

Please add the following claims:

--19. (new) An arrangement for organizing flat items of mail, in accordance with a definable sequence of delivery points assigned to the recipient addresses, into a plurality of depositing receptacles (2) into which in each case a plurality of items of mail (3) can be destacked in organized fashion, having a reading arrangement for determining the direct or indirect address information located on the items of mail (3) separated by means of separating arrangement, having a plurality of containers (1, 4) which circulate on at least one conveying arrangement and are intended for receiving, for transporting and for discharging in a controllable manner in each case one item of mail (3) into the depositing receptacles (2) in a number of circulating cycles, and having a control arrangement which, with knowledge of the address information of all the items of mail (3) located in the containers (1), controls the discharge of the items of mail (3) from the containers (1) to the depositing receptacles (2) such that the sequence of the items of mail (3) in a definable order of the depositing receptacles (2) corresponds to the sequence of the delivery points assigned to

the addresses, the order of the items of mail (3) in each depositing receptacle (2) corresponding to the sequence of the delivery points assigned to the addresses of the items of mail (3) located in the respective depositing receptacle (2), characterized in that the depositing receptacles (2) are arranged along the conveying arrangement, and in that the depositing receptacles (2) are subdivided into two more or less equally sized groups and, in the case of organizing sorting runs proceeding one after the other, the items of mail (3) of different address areas are alternately sorted only into one of the two depositing-receptacle groups.

--20. (new) The arrangement as claimed in claim 19, characterized in that the items of mail (3) of the current address area can be loaded into empty circulating containers (4) while items of mail (3) of the preceding address area are still located in containers (1).

--21. (new) The arrangement as claimed in claim 20, characterized in that the loading location of the containers (4) can be moved along the circulating containers (1, 4) in a controlled manner, within defined limits, such that the item of mail (3) which is to be loaded in each case can be loaded,

without any loading delay, into an empty container (4) located in the defined movement range of the loading location.

--22. (new) The arrangement as claimed in claim 19, characterized in that, once the non-sorted items of mail (3) have been loaded into the empty containers (4), pre-sorted items of mail (3) for the same address area can be loaded into the still empty containers (4) or containers (4) which are just becoming empty as a result of the non-sorted items of mail (3) being discharged to the depositing receptacles (2), the delivery points being assigned place numbers in accordance with their defined order in the respective depositing receptacles (3), and the pre-sorting operation taking place such that the items of mail (3) which are assigned to the delivery points with the lower place numbers can be separated before the items of mail (3) with the higher assigned place numbers.

--23. (new) The arrangement as claimed in claim 22, characterized in that the non-sorted items of mail (3) of the current address area can be loaded into empty circulating containers (4) while items of mail (3) of the preceding address area are still located in containers (1).

--24. (new) A process for organizing flat items of mail, in accordance with a definable sequence of delivery points assigned to the recipient addresses, into a plurality of depositing receptacles (2) into which in each case a plurality of items of mail (3) are destacked in organized fashion, in the case of which the direct or indirect address information located on the separated items of mail (3) is read, in each case one item of mail (3) is received into one of a plurality of containers (1, 4) circulating on at least one conveying arrangement, is transported therein and is discharged in a controlled manner into the depositing receptacles (2) in a number of circulating cycles, it being the case that, with knowledge of the address information of all the items of mail (3) located in the containers (1), said items of mail are discharged from the containers (1) to the depositing receptacles (2) such that the sequence of the items of mail (3) in a definable order of the depositing receptacles (2) corresponds to the sequence of the delivery points assigned to the addresses, and it being the case that the order of the items mail (3) in each depositing receptacle (2) corresponds to the sequence of the delivery points assigned to the addresses of the items of mail located in the respective depositing receptacle (2), characterized in that the depositing receptacles (2) are arranged along the conveying arrangement and are subdivided into two more or less equally

sized groups and, in the case of organizing sorting runs proceeding one after the other, the items of mail (3) of different address areas are alternately sorted only into one of the two depositing-receptacle groups.

--25. (new) The process as claimed in claim 24, characterized in that the items of mail (3) of the current address area are loaded into empty circulating containers (4) while items of mail (3) of the preceding address area are still located in containers (1).

--26. (new) The process as claimed in claim 24, characterized in that, once the non-sorted items of mail (3) have been loaded into the empty containers (4), pre-sorted items of mail (3) for the same address area are loaded into the still empty containers (4) or containers (4) which are just becoming empty as a result of the non-sorted items of mail (3) being discharged to the depositing receptacles (2), the delivery points being assigned place numbers in accordance with their defined order in the respective depositing receptacles (2), and the pre-sorting operation taking place such that the items of mail (3) which are assigned to the delivery points with the lower place numbers can be separated before the items of mail (3) with the higher assigned place numbers.

--27. (new) The process as claimed in claim 26, characterized in that the non-sorted items of mail (3) of the current address area are loaded into empty circulating containers (4) while items of mail (3) of the preceding address area are still located in containers (1).--

REMARKS

Claims 1-18 have been cancelled and claims 19-27 have been added.

The above replacement of the claims and the specification have been done to place this national phase application in substantially the same condition as it was during Chapter II of the International Phase.

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Attached hereto is a marked-up version of the changes made to the specification by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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Attachments

7/1/97 1

Description

Arrangement and process for organizing flat items of mail

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The invention relates to an arrangement and to a process for organizing flat items of mail according to the preamble of claims 1 and 11.

10 Certain tasks, in particular mail delivery, require the items of mail present to be stacked in a certain order which corresponds, for example, to the sequence of the delivery points (of the so-called route taken by the mail-delivery person). In this case, the address which
15 appears on the item of mail, and corresponds to a delivery point, constitutes the organizing criterion, while the sequence of the delivery points constitutes the organized order which is to be produced.

In order to organize items in a certain order,
20 EP 820 818 A1 has disclosed a solution which utilizes an intermediate store which comprises pockets or similar elements which each receive an item of mail and, on command, can discharge it again into the actual depositing compartment. In this case, initially all the
25 items of mail which are to be organized are accommodated in any desired order in the pockets of the intermediate store. Then, the items of mail are removed from the pockets of the intermediate store, and transferred into the depositing compartments, such that
30 they are located in the latter in the organized order which is to be produced. A dedicated depositing receptacle is provided for each item of mail. The sorting takes place with two circulating cycles of the pockets of the intermediate store, one circulating
35 cycle for filling the pockets and a further circulating cycle for emptying the pockets.

A large number of depositing compartments, however, is necessary for this purpose, each depositing compartment

having to be equipped with a control mechanism which causes the item of mail to be transferred from the correct pocket of the intermediate store.

Another, frequently used process, referred to as a multi-pass or radix sort process, for organizing items of mail is based on the items of mail passing through the same sorting arrangement a number of times, a separate control program being used in each pass. It is thus possible to manage with a small number of stacking compartments in relation to the number of delivery points. The disadvantages of this process are constituted by the large amount of time required, relatively high error rates and the relatively pronounced mechanical loading to which the items of mail are subjected on account of passing through the sorting machine a number of times (DE 43 02 231 C2, DE 197 14 184 A1).

The invention explained in claims 1 and 11 is based on the object of providing an arrangement and a process for organizing flat items of mail according to the preambles with a reduction in the number of depositing receptacles and of associated control elements in relation to the prior art, and with the items of mail only being separated and read once in a sorting run, said arrangement and process also making it possible to reduce the amount of effort required on the part of the operator and to include pre-sorted items of mail with low sorting outlay.

The design of the depositing receptacles for receiving a plurality of flat items of mail as stacks and the operation of sorting or organizing the items of mail in a number of circulating cycles of the containers, which circulate in a closed loop and in which the items of mail located in the containers, according to their address information, are discharged to the depositing receptacles in a controlled manner in accordance with a definable sequence of delivery points assigned to the

recipient addresses, the order of the items of mail in each depositing receptacle corresponding to the sequence of the delivery points assigned to the addresses of the items of mail located in the
5 respective depositing receptacle, makes it necessary to have only a small number of depositing receptacles and thus only a small number of diverters and control elements for discharging items of mail.

10 Advantageous configurations of the invention are specified in the subclaims. Arranging the depositing receptacles in two rows which are aligned parallel to one another, at a distance apart, and horizontally
15 straightforwardly from the depositing receptacles.

If certain delivery points are fixedly assigned to the respective depositing receptacles, then all the items of mail which are intended for a certain delivery zone
20 are always located in one depositing receptacle. This assignment is defined before the recipient addresses of the items of mail which are to be organized are known. This is necessary if these items of mail are to be handled separately from items of mail for other
25 delivery zones.

If the depositing receptacles are to be filled uniformly, then it is advantageous, with knowledge of the address, for the items of mail to be assigned
30 flexibly to the depositing receptacles such that in each case approximately equal numbers of items of mail are located in the depositing receptacles or, in the case of the thicknesses of the individual items of mail being measured, the stacks are of approximately equal
35 height.

The further configuration of the invention where the depositing receptacles are subdivided into two groups and, in the case of organizing sorting runs proceeding

one after the other, the items of mail of different address areas are alternately sorted only into one of the two depositing-receptacle groups, allows staggered processing, i.e. while the items of mail for one address area are transported out of the compartments into the depositing receptacles, the still full depositing receptacles of the other address area are emptied at the same time. This means that only one operator is necessary, and he/she need not simultaneously empty depositing receptacles and introduce items of mail for separation.

Furthermore, it is advantageous for the operations of sorting the items of mail of the two groups to overlap in time such that items of mail of one group are loaded into empty containers while the operation of emptying into the depositing receptacles the items of mail filled with items of mail of the other, previous group is still proceeding. This makes it possible to increase the sorting throughput. In order for this overlapping operation to take place effectively, in a further configuration, the loading location of the containers can be moved in a controlled manner such that the item of mail which is to be loaded in each case can be loaded, without any loading delay, into an already empty container located in the defined movement range.

According to another development, it is possible for pre-sorted items of mail to be included in the organizing process such that the smallest possible number of circulating cycles of the containers is necessary and it is possible to organize more items of mail than there are containers present. For this purpose, once the non-sorted items of mail have been loaded into the containers, the pre-sorted items of mail are loaded into the still empty

receptacles, and the pre-sorting operation takes place such that the items of mail which are assigned to the delivery points with the lower place numbers can be separated before the items of mail with the higher place numbers.

In conjunction with the pre-sorted items of mail included, it is, moreover, advantageous for the non-sorted items of mail of the current address area to be loaded into empty circulating containers even when items of mail of the preceding address area are still located in containers, i.e. this emptying operation has not yet been completed. This makes possible a further increase in the output capacity during the sorting operation since the situation where containers stand empty during the sorting operation is largely avoided.

An exemplary embodiment of the invention is explained in more detail hereinbelow with reference to the drawings.

In the drawings:

figure 1 shows a schematic illustration of the circulating containers being loaded, without overlapping operation,

figure 2 shows a schematic illustration of the containers being emptied into depositing receptacles, without overlapping operation,

figure 3 shows the time sequence of the organizing sorting, without overlapping operation,

figure 4 shows the time sequence of the organizing sorting of items of mail of a plurality of address areas into two depositing-receptacle groups, without overlapping operation,

figure 5 shows the time sequence of the organizing sorting of items of mail of a plurality of address areas into two depositing-receptacle groups, with overlapping operation,

5

figure 6 shows the time sequence of the organizing sorting with pre-sorted items of mail, without overlapping operation,

10 figure 7 shows the time sequence of the organizing sorting, with pre-sorted items of mail, into two depositing-receptacle groups, with overlapping operation, and

15 figure 8 shows the sequence of the organizing process with pre-sorted items of mail in a number of circulating cycles of the containers.

20 According to figures 1 and 2, the items of mail are sorted in a sorting arrangement having an intermediate store, which comprises containers 1, 4 circulating in a closed loop, and having a series of depositing receptacles 2, the depositing receptacles 2 being envisaged for receiving more than one item of mail 3 in
25 organized fashion, with the result that the number of depositing receptacles 2 can be kept considerably smaller than the number of containers 1, 4. It is, however, the case that a number of circulating cycles of the containers 1, 4 of the intermediate store are
30 necessary in order for all the items of mail 3 to be transferred from the containers 1 into the depositing receptacles 2.

The organizing operation takes place in the following
35 steps:

1. Transporting an addressed item of mail 3 past a reading arrangement into a free container 4 of the circulating intermediate store.

2. Determining the address or suitable information on the item of mail 3.
3. Repeating steps 1 and 2 until all the items of mail 3 are located in each case in one container 1 of the intermediate store.
4. As soon as an item of mail 3 is located above that depositing receptacle 2 into which, with account being taken of the address information read from all the items of mail 3 located in the containers 1, it has to be deposited before all other items of mail in order to produce the desired organized order, the container 1 is opened and the item of mail 3 is deposited in said depositing receptacle 2.
5. When all the containers 1 are empty, the items of mail 3 located in the form of sub-stacks 5 in the depositing receptacles 2 are removed therefrom in order and, if appropriate, combined to form one or more stacks.
6. Repeating steps 1 to 5, if appropriate, for the next address area.

Figure 3 illustrates the time sequence of the abovedescribed process steps for a single address area.

	Introduction	= steps 1 to 3
25	Destacking	= step 4
	Emptying	= step 5

The assignment between the items of mail 3 which are to be organized and all belong to a defined address area (corresponds to one or more delivery areas) and the depositing receptacles 2 is determined, in a first variant, by groups of addresses (delivery points) being assigned to the depositing receptacles 2, with the result that a depositing receptacle 2 is clearly assigned to each address. The groups of addresses assigned to the individual depositing receptacles 2 correspond in each case to a continuous section of the organized order which is to be produced.

As an example, the following organized order of the items of mail 3 is to be produced in accordance with addresses for a single address area:

A-Street 1 → A-Street 3 → A-Street 5 → A-Street 7 →

5 B-Lane 8 → B-Lane 7 → B-Lane 6 → B-Lane 5

→ B-Lane 3 → B-Lane 2 → A-Street 2 → A-Street 4 →

A-Street 6 → A-Street 8 → C-Avenue 1 → C-Avenue 2 →

C-Avenue 3 → C-Avenue 4 → C-Avenue 5 → C-Avenue 6 →

C-Avenue 7

10 Assignment of the addresses to the depositing receptacles:

Depositing Receptacle 1	Depositing Receptacle 2	Depositing Receptacle 3
A-Street 1	B-Lane 6	A-Street 8
A-Street 3	B-Lane 5	C-Avenue 1
A-Street 5	B-Lane 3	C-Avenue 2
A-Street 7	B-Lane 2	C-Avenue 3
B-Lane 8	A-Street 2	C-Avenue 4
B-Lane 7	A-Street 4	C-Avenue 5
	A-Street 6	C-Avenue 6
		C-Avenue 7

15 The assignment of the addresses to the depositing receptacles 2 is not made dependent on how many and/or on what kind of items of mail 3 which are to be organized are actually present for the individual addresses. Rather, this assignment has been defined before the addresses of the items of mail 3 which are to be organized are known.

20 The advantage of such a fixed assignment consists in that all the items of mail which are intended for a certain delivery zone are always located in one depositing receptacle 2, and these items of mail are to be kept separate from the items of mail for other
25 delivery zones (the items of mail are not combined to form an overall stack).

As an alternative to this, it is possible, for the purpose of optimizing the filling of the depositing

receptacles 2, for the assignment between the items of mail 3 which are to be organized and the depositing receptacles 2 to be defined only once all the items of mail are located in the containers 1 of the intermediate store.

This defining operation takes place either such that, at the end, an essentially equal number of items of mail 3 is located in each of the depositing receptacles 2 or that the mail stacks 7 which are located in each of the depositing receptacles 2 at the end are of essentially equal thickness.

The advantage of such flexible assignment consists in that the risk of depositing receptacles 2 overflowing is reduced, or in that only as many depositing receptacles 2 of the sorting arrangement are occupied as are necessary for the given quantity of items of mail 3 which are to be organized without said depositing receptacles overflowing.

If the depositing receptacles 2 are combined into two essentially equally sized groups, which are each assigned a separate address area for which items of mail 3 are to be organized, then it is simultaneously possible for items of mail 3 for a given address area to be deposited in the depositing receptacles 2 of one group while items of mail 3 are still located in the depositing receptacles 2 of the other group, which latter items of mail were previously deposited therein and can now be removed.

The advantage consists in that an operator can keep up with the sorting arrangement in that, rather than having to take place at the same time as the operation of filling the intermediate store, it is possible to utilize, for the operation of emptying the depositing receptacles 2, that period of time during which the items of mail are transferred (automatically) from the containers 1 of the intermediate store into the depositing receptacles 2.

Figure 4 illustrates the corresponding time sequence of the process steps for the case where items of mail for

a number of address areas are to be organized one after the other.

This process can be carried out more effectively in terms of time if steps 1 to 3 (filling the intermediate store) for the items of mail of the current address area are carried out while items of mail of the preceding address area are still located in the containers 1 and are being transported into the depositing receptacles 2. It is a prerequisite for the advantageous use of this variant that the sorting arrangement allows the intermediate store to be filled continuously, in a manner in which it essentially keeps up with the emptying of the intermediate store, even when an essentially variable number of (occupied) containers 2 is located between two (empty) containers 2 which are to be filled one after the other, e.g. an empty compartment is followed by 5 occupied compartments, this is followed by an empty compartment, the latter is followed by 8 occupied compartments, this is followed by an empty compartment, the latter is followed by 2 occupied compartments etc. This makes it possible to organize considerably more items of mail in the same period of time.

Figure 5 illustrates the corresponding time sequence of the process steps for this purpose.

In the case of a fixed depositing-receptacle/address assignment, it is possible for those items of mail which are already present in an organized state to be advantageously combined with those which have still to be organized, with the result that it is possible to introduce into the organized order which is to be produced more items of mail than the sorting arrangement has storage spaces (containers).

For the efficiency of this process, observing the following conditions is essential:

- Only items of mail which are intended for the same previously defined address area (corresponds to one or more delivery areas) are processed together.

- Within each group of addresses which are assigned to a depositing receptacle in each case, the addresses (delivery points) are numbered continuously (fictitious place number), beginning at 1, in accordance with the organized order which is to be produced.
- The organized order in which the organized quantity of items of mail have to be present has all the addresses (delivery points) with a lower place number preceding the addresses (delivery points) with a higher place number.

According to the previous example, the organized order of the addresses for a single address area which is to be produced is as follows:

- 15 A-Street 1 → A-Street 3 → A-Street 5 → A-Street 7 →
 B-Lane 8 → B-Lane 7 → B-Lane 6 → B-Lane 5 → B-Lane 3
 → B-Lane 2 → A-Street 2 → A-Street 4 → A-Street 6 →
 A-Street 8 → C-Avenue 1 → C-Avenue 2 → C-Avenue 3 →
 C-Avenue 4 → C-Avenue 5 → C-Avenue 6 → C-Avenue 7
- 20 Assignment of the addresses to the depositing receptacles and fictitious place numbers:

Fictitious place number	Stacking compartment 1	Stacking compartment 2	Stacking compartment 3
1	A-Street 1	B-Lane 6	A-Street 8
2	A-Street 3	B-Lane 5	C-Avenue 1
3	A-Street 5	B-Lane 3	C-Avenue 2
4	A-Street 7	B-Lane 2	C-Avenue 3
5	B-Lane 8	A-Street 2	C-Avenue 4
6	B-Lane 7	A-Street 4	C-Avenue 5
7		A-Street 6	C-Avenue 6
8			C-Avenue 7

- Example of the organized order in which an organized quantity of the items of mail has to be present:
- 25

A-Street 1 → A-Street 8 → C-Avenue 1 → A-Street 3 →
 B-Lane 5
 → A-Street 5 → C-Avenue 3 →
 A-Street 2 → C-Avenue 5

5 The organizing operation then contains the following steps:

1. Transporting an addressed item of mail 3 from the quantity of non-organized items of mail past a reading arrangement into a free container 4 of the sorting arrangement
2. Determining the address or suitable information on the item of mail 3
3. Repeating steps 1 and 2 until all the non-organized items of mail 3 are located in each case in one container 1 of the intermediate store.
4. Transporting an addressed item of mail 3 from the quantity of organized items of mail past the reading arrangement into a free container 4 of the sorting arrangement (beginning with the item of mail which has the lowest place number).
5. Determining the address or suitable information on the item of mail 3.
6. Repeating steps 4 and 5 until all the organized items of mail 3 have passed the sorting arrangement.
7. (parallel to 6.) As soon as a first item of mail 3 is located above that depositing receptacle 2 in which, with account being taken of the address information read from all the items of mail 3 located in the containers 1, it should be deposited before all other items of mail in order to produce the desired organized order and, for the case where this item of mail 3 does not belong to the quantity of organized items of mail, at least a second item of mail is located in one of the containers 1, this being distinguished in that it belongs to the quantity of organized items of mail and is intended for said depositing

receptacle 2, the container 1 in which the first item of mail 3 is located is opened and the item of mail 3 is deposited in said depositing receptacle 2.

- 5 8. When all the containers 1 are empty, the items of mail 3 located in the form of sub-stacks 5 in the depositing receptacles 2 are removed therefrom in order and, if appropriate, combined to form one or more stacks.
- 10 9. Repeating steps 1 to 8, if appropriate, for the next address area.

Figure 6 shows the corresponding time sequence of these process steps with the following assignments:

- | | | |
|----|-------------------------|----------------|
| | Introduction | = steps 1 to 3 |
| 15 | Pre-sorted introduction | = steps 4 to 6 |
| | Destacking | = step 7 |
| | Emptying | = step 8 |

It is also possible here for the organizing operation with inclusion of pre-sorted items of mail for the current address area to be carried out while items of mail of the previous address area are still located in the containers 1 and are being conveyed into the depositing receptacles 2. This likewise increases the throughput and/or the time available for removing items of mail. Figure 7 illustrates the corresponding time sequence, in which

- | | | |
|----|-------------------------|----------------|
| | Introduction | = steps 1 to 3 |
| | Pre-sorted introduction | = steps 4 to 6 |
| 30 | Destacking | = step 7 |
| | Emptying | = step 8 |

An actual sorting run proceeds as follows:

Order of the non-organized items of mail (21 items) in the containers of the intermediate store:

C2-A6-B3-A1-C5-B3-A2-B8-C7-B6-A5-C4-B7-A8-C1-B8-B5-C6-A3-C3-A7

Order of the organized items of mail (9 items, lower-case letters indicate that the items of mail belong to the quantity of organized items of mail):

a1-a8-c1-a3-b5-a5-c3-a2-c5

- 5 The following organized items of mail (3 items) are filled into containers of the intermediate store following the non-organized items of mail:

a1-a8-c1

10 The items of mail are then conveyed into the depositing receptacles.

6 items of mail are deposited during the 1st circulating cycle of the containers (figure 8a). The 6 containers which are becoming empty here are filled again with 6 organized items of mail during the same circulating cycle.

15 5 items of mail are then deposited during the 2nd circulating cycle of the pockets (figure 8b).

Since there are no longer any organized items of mail present to be filled into the containers, it is only the operation of sorting into the depositing receptacles which takes place in the next circulating cycles, without the containers being refilled (the containers which remain empty are indicated by **).

20 Then, in the correct order, 8 items of mail are conveyed into the depositing receptacles during the 3rd circulating cycle, 6 items of mail are conveyed into the depositing receptacles during the 4th circulating cycle, 4 items of mail are conveyed into the depositing receptacles during the 5th circulating cycle and the rest of the items of mail are conveyed into the depositing receptacles during the 6th circulating cycle (figures 8c - 8f).

Patent Claims

1. An arrangement for organizing flat items of mail in accordance with a definable sequence of delivery points assigned to the recipient addresses, having
5 a reading arrangement for determining the direct or indirect address information located on the items of mail (3) separated by means of a separating arrangement,
10 a plurality of containers (1, 4) which circulate on at least one conveying arrangement and are intended for receiving, for transporting and for discharging in a controllable manner in each case one item of mail (3),
15 a plurality of depositing receptacles (2) which are arranged along the conveying arrangement and receive the items of mail (3) from the containers (1), and
a control arrangement which, with knowledge of the address information of all the items of mail (3) located in the containers (1), controls the discharge
20 of the items of mail (3) from the containers (1) to the depositing receptacles (2) such that the sequence of the items of mail (3) in a definable order of the depositing receptacles (2) corresponds to the sequence of the delivery points assigned to the addresses,
25 characterized in that in each case a plurality of items of mail (3) can be destacked in organized fashion into the depositing receptacles (2), and in that the discharge of the items of mail (3) from the containers (1) into the depositing receptacles (2) takes place in
30 a number of circulating cycles, the order of the items of mail (3) in each depositing receptacle (2) corresponding to the sequence of the delivery points assigned to the addresses of the items of mail (3) located in the respective depositing receptacle (2).
35
2. The arrangement as claimed in claim 1, characterized in that the depositing receptacles (2) are arranged in two rows which are aligned parallel to one another, at a distance apart, and horizontally.

3. The arrangement as claimed in claim 1, characterized in that depositing receptacles (2) or groups of depositing receptacles (2) are assigned to defined delivery points.

4. The arrangement as claimed in claim 1, characterized in that the items of mail (3) can be distributed over the depositing receptacles (2) such that a more or less equal number of items of mail (3) is located in each depositing receptacle (2).

5. The arrangement as claimed in claim 1, characterized in that a thickness-measuring arrangement is provided for measuring the thickness of the items of mail (3), and the items of mail (3) can be distributed over the depositing receptacles (2) such that all the mail stacks (5) are of approximately equal height.

6. The arrangement as claimed in one of claims 1 - 5, characterized in that the depositing receptacles (2) are subdivided into two more or less equally sized groups and, in the case of organizing sorting runs proceeding one after the other, the items of mail (3) of different address areas are alternately sorted only into one of the two depositing-receptacle groups.

7. The arrangement as claimed in claim 6, characterized in that the items of mail (3) of the current address area can be loaded into empty circulating containers (4) while items of mail (3) of the preceding address area are still located in containers (1).

8. The arrangement as claimed in claim 7, characterized in that the loading location of the containers (4) can be moved along the circulating containers (1, 4) in a controlled manner, within defined limits, such that the item of mail (3) which is

to be loaded in each case can be loaded, without any loading delay, into an empty container (4) located in the defined movement range of the loading location.

5 9. The arrangement as claimed in claims 3 and 8, characterized in that, once the non-sorted items of mail (3) have been loaded into the empty containers (4), pre-sorted items of mail (3) for the same address area can be loaded into the still empty containers (4)
10 or containers (4) which are just becoming empty as a result of the non-sorted items of mail (3) being discharged to the depositing receptacles (2), the delivery points being assigned place numbers in accordance with their defined order in the respective
15 depositing receptacles (3), and the pre-sorting operation taking place such that the items of mail (3) which are assigned to the delivery points with the lower place numbers can be separated before the items of mail (3) with the higher assigned place numbers.

20 10. The arrangement as claimed in claims 7 and 9, characterized in that the non-sorted items of mail (3) of the current address area can be loaded into empty circulating containers (4) while items of mail (3) of
25 the preceding address area are still located in containers (1).

30 11. A process for organizing flat items of mail in accordance with a definable sequence of delivery points assigned to the recipient addresses, in the case of which

the direct or indirect address information located on the separated items of mail (3) is read,
in each case one item of mail (3) is received into one
35 of a plurality of containers (1, 4) circulating on at least one conveying arrangement, is transported therein and is discharged in a controlled manner into depositing receptacles (2) arranged along the conveying arrangement, it being the case that, with knowledge of

the address information of all the items of mail (3) located in the containers (1), said items of mail are discharged from the containers (1) to the depositing receptacles (2) such that the sequence of the items of mail (3) in a definable order of the depositing receptacles (2) corresponds to the sequence of the delivery points assigned to the addresses, characterized in that in each case a plurality of items of mail (3) are destacked in organized fashion into the depositing receptacles (2), and in that the discharge of the items of mail (3) from the containers (1) into the depositing receptacles (2) takes place in a number of circulating cycles, the order of the items of mail (3) in each depositing receptacle (2) corresponding to the sequence of the delivery points assigned to the addresses of the items of mail located in the respective depositing receptacle (2).

12. The process as claimed in claim 11, characterized in that depositing receptacles (2) or groups of depositing receptacles (2) are assigned to defined delivery points.

13. The process as claimed in claim 11, characterized in that the items of mail (3) are distributed over the depositing receptacles (2) such that a more or less equal number of items of mail (3) is located in each depositing receptacle (2).

14. The process as claimed in claim 11, characterized in that the thickness of the items of mail (3) is measured and the items of mail (3) are distributed over the depositing receptacles (2) such that all the mail stacks (5) are of approximately equal height.

15. The process as claimed in one of claims 11 - 14, characterized in that the depositing receptacles (2) are subdivided into two more or less equally sized groups and, in the case of organizing sorting runs

proceeding one after the other, the items of mail (3) of different address areas are alternately sorted only into one of the two depositing-receptacle groups.

5 16. The process as claimed in claim 15, characterized in that the items of mail (3) of the current address area are loaded into empty circulating containers (4) while items of mail (3) of the preceding address area are still located in containers (1).

10

17. The process as claimed in claim 11, characterized in that, once the non-sorted items of mail (3) have been loaded into the empty containers (4), pre-sorted items of mail (3) for the same address area are loaded
15 into the still empty containers (4) or containers (4) which are just becoming empty as a result of the non-sorted items of mail (3) being discharged to the depositing receptacles (2), the delivery points being assigned place numbers in accordance with their defined
20 order in the respective depositing receptacles (2), and the pre-sorting operation taking place such that the items of mail (3) which are assigned to the delivery points with the lower place numbers can be separated before the items of mail (3) with the higher assigned
25 place numbers.

18. The process as claimed in claims 16 and 17, characterized in that the non-sorted items of mail (3) of the current address area are loaded into empty
30 circulating containers (4) while items of mail (3) of the preceding address area are still located in containers (1).

Abstract

Arrangement and process for organizing flat items of mail

In order to organize flat items of mail in accordance with a definable sequence of delivery points assigned to the recipient addresses, having a plurality of
5 containers which circulate on at least one conveying arrangement and are intended for receiving, for transporting and for discharging in a controllable manner in each case one item of mail to depositing receptacles, in each case a plurality of items of mail
10 are destacked in organized fashion into the depositing receptacles. The discharge of the items of mail from the containers into the depositing receptacles takes place in a number of circulating cycles, the order of the items of mail in each depositing receptacle
15 corresponding to the sequence of the delivery points assigned to the addresses of the items of mail located in the respective depositing receptacle. In the case of the depositing receptacles being subdivided into two groups, the items of mail of the current address area
20 can be loaded into empty circulating containers while items of mail of the preceding address area are still located in containers.

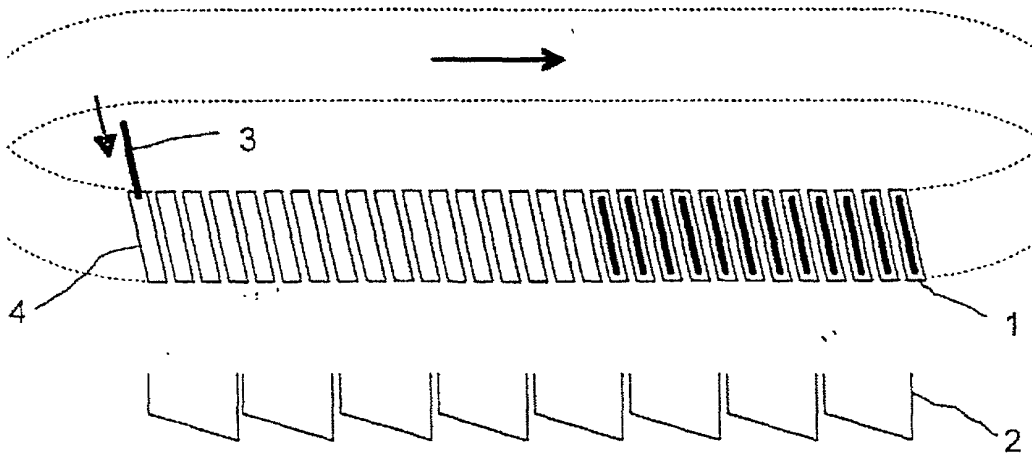


FIG 1

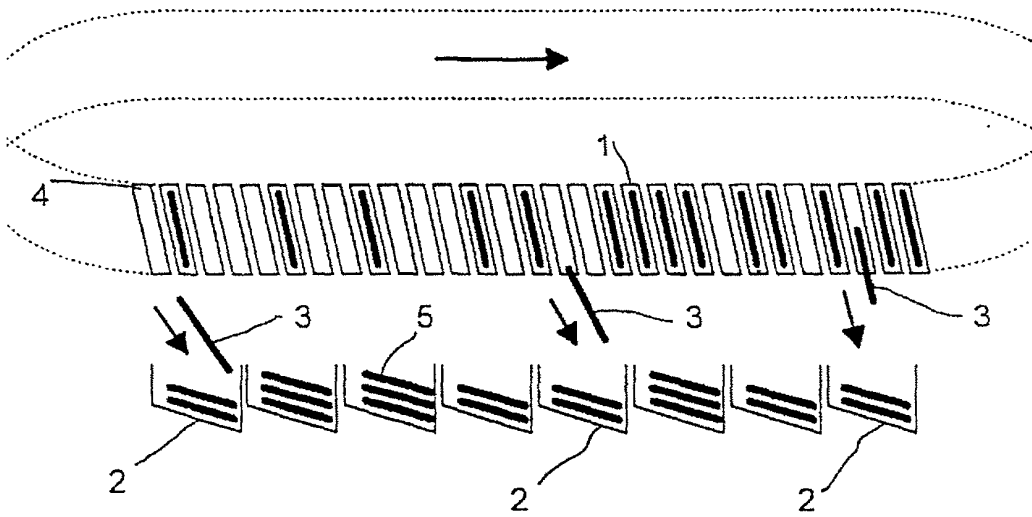
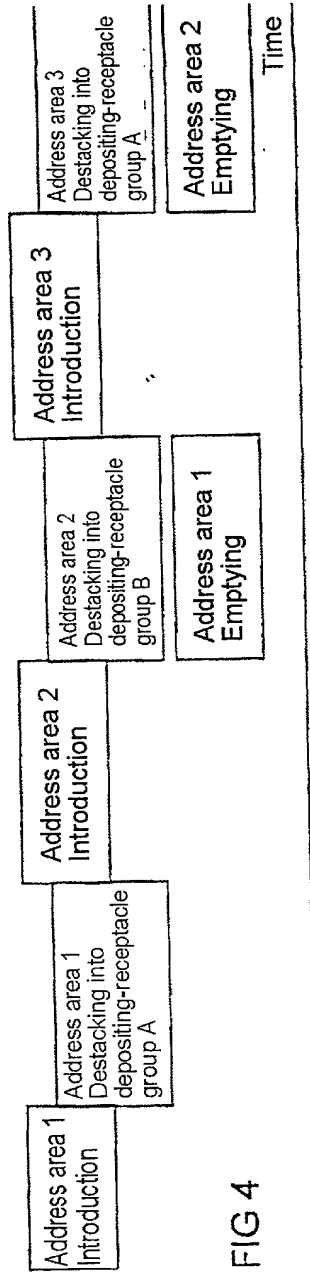
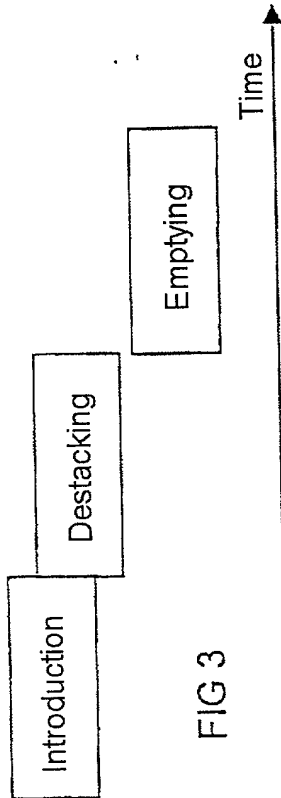
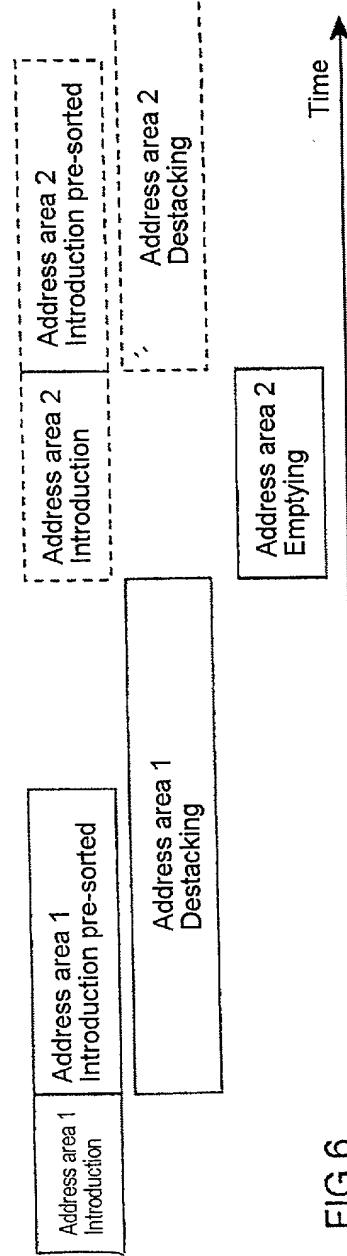
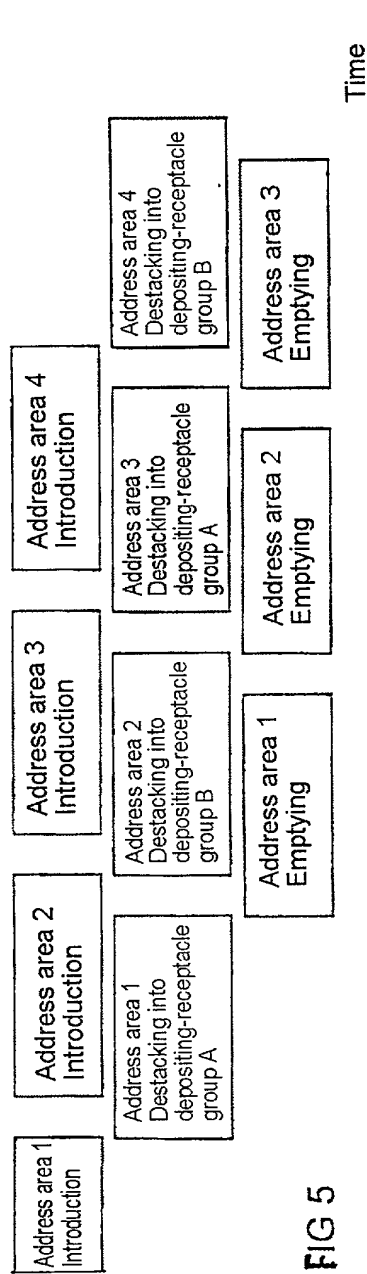


FIG 2





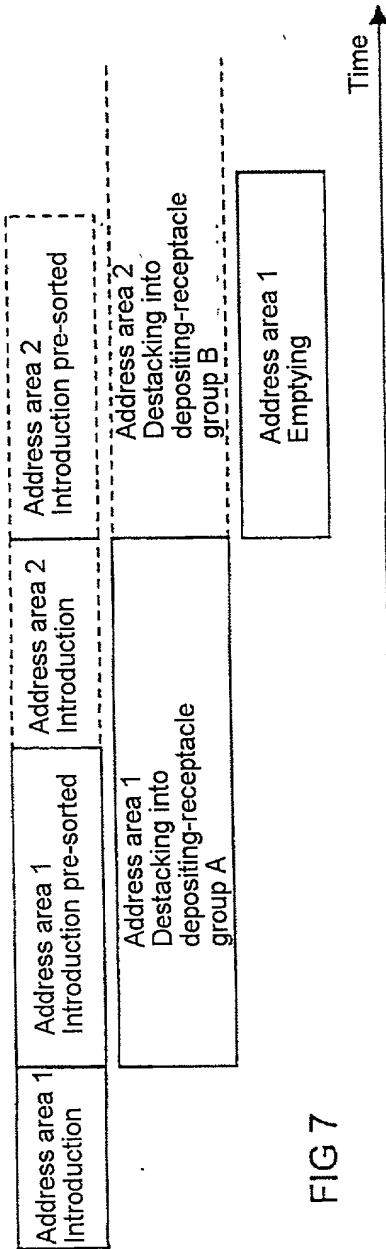


FIG 7

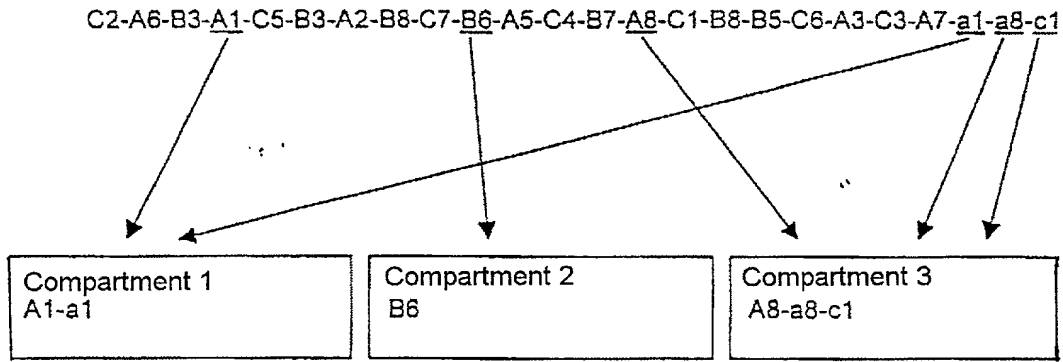


FIG 8a

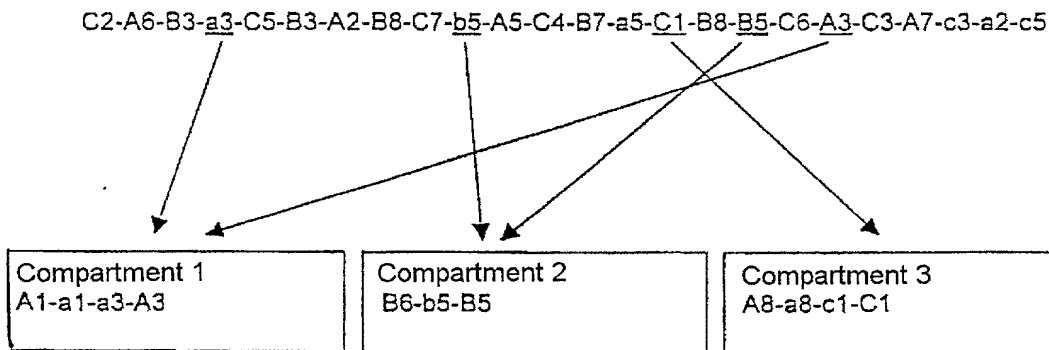


FIG 8b

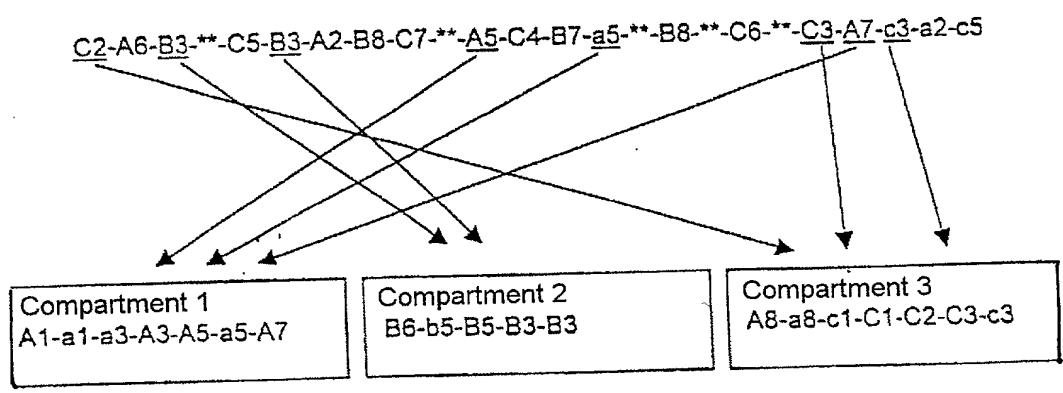


FIG 8c

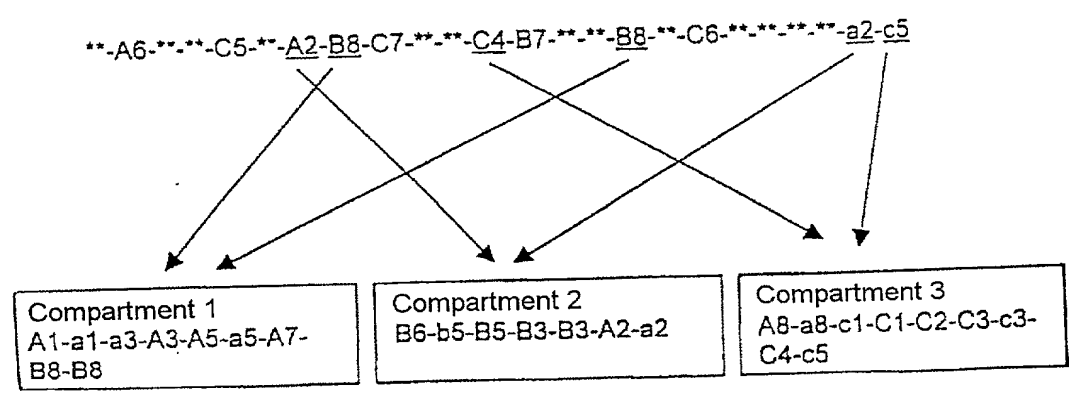


FIG. 8d

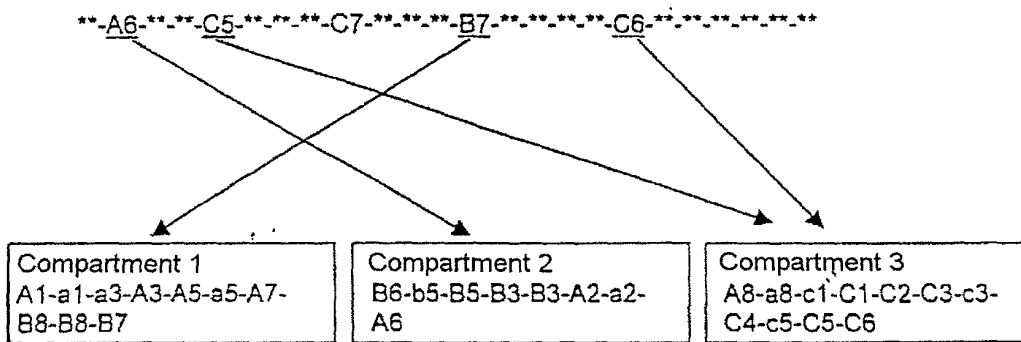


FIG 8e

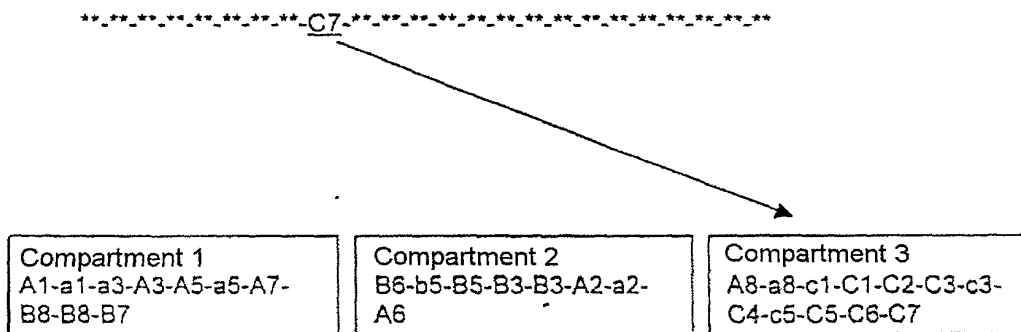


FIG 8f

Description

Arrangement and process for organizing flat items of mail

5

The invention relates to an arrangement and to a process for organizing flat items of mail according to the preamble of claims 1 and 6.

10

Certain tasks, in particular mail delivery, require the items of mail present to be stacked in a certain order which corresponds, for example, to the sequence of the delivery points (of the so-called route taken by the mail-delivery person). In this case, the address which appears on the item of mail, and corresponds to a delivery point, constitutes the organizing criterion, while the sequence of the delivery points constitutes the organized order which is to be produced.

15

In order to organize items in a certain order, EP 820 818 A1 has disclosed a solution which utilizes an intermediate store which comprises pockets or similar elements which each receive an item of mail and, on command, can discharge it again into the actual depositing compartment. In this case, initially all the items of mail which are to be organized are accommodated in any desired order in the pockets of the intermediate store. Then, the items of mail are removed from the pockets of the intermediate store, and transferred into the depositing compartments, such that they are located in the latter in the organized order which is to be produced. A dedicated depositing receptacle is provided for each item of mail. The sorting takes place with two circulating cycles of the pockets of the intermediate store, one circulating cycle for filling the pockets and a further circulating cycle for emptying the pockets.

20

25

30

35

A large number of depositing compartments, however, is necessary for this purpose, each depositing compartment

having to be equipped with a control mechanism which causes the item of mail to be transferred from the correct pocket of the intermediate store.

- 5 US-A-5042667 describes a sorting arrangement having containers, a conveying arrangement and depositing receptacles, and also describes a process for organizing items of mail in accordance with a definable sequence of delivery points which are assigned to
10 recipient addresses. In this, in each case a plurality of items of mail can be destacked in organized fashion in the depositing receptacles, the discharge from the containers into the depositing receptacles takes place in a number of circulating cycles and the sequence of
15 the items of mail in each depositing receptacle corresponds to the sequence of the delivery points assigned to the respective mail addresses.

- Another, frequently used process, referred to as a
20 multi-pass or radix sort process, for organizing items of mail is based on the items of mail passing through the same sorting arrangement a number of times, a separate control program being used in each pass. It is thus possible to manage with a small number of stacking
25 compartments in relation to the number of delivery points. The disadvantages of this process are constituted by the large amount of time required, relatively high error rates and the relatively pronounced mechanical loading to which the items of
30 mail are subjected on account of passing through the sorting machine a number of times (DE 43 02 231 C2, DE 197 14 184 A1).

- The invention explained in claims 1 and 6 is based on
35 the object of providing an arrangement and a process for organizing flat items of mail according to the preambles, with the items of mail only being separated and read once in a sorting run, said arrangement and

process making it possible to reduce the amount of effort required on the part of the operator and to include pre-sorted items of mail with low sorting outlay.

5

The design of the depositing receptacles for receiving a plurality of flat items of mail as stacks and the operation of sorting or organizing the items of mail in a number of circulating cycles of the containers, which
10 circulate in a closed loop and in which the items of mail located in the containers, according to their address information, are discharged to the depositing receptacles in a controlled manner in accordance with a definable sequence of delivery points assigned to the
15 recipient addresses, the order of the items of mail in each depositing receptacle corresponding to the sequence of the delivery points assigned to the addresses of the items of mail located in the respective depositing receptacle, and the subdivision
20 of the depositing receptacles into two groups, where, in the case of organizing sorting runs proceeding one after the other, the items of mail of different address areas are alternately sorted only into one of the two depositing-receptacle groups, allows staggered
25 processing, i.e. while the items of mail for one address area are transported out of the compartments into the depositing receptacles, the still full depositing receptacles of the other address area are emptied at the same time. This means that only one
30 operator is necessary, and he/she need not simultaneously empty depositing receptacles and introduce items of mail for separation.

Advantageous configurations of the invention are
35 specified in the subclaims.

It is thus advantageous for the operations of sorting the items of mail of the two groups to overlap in time

such that items of mail of one group are loaded into empty containers while the operation of emptying into the depositing receptacles the items of mail filled with items of mail of the other, previous group is still proceeding. This makes it possible to increase the sorting throughput.

According to another development, it is possible for pre-sorted items of mail to be included in the organizing process such that the smallest possible number of circulating cycles of the containers is necessary and it is possible to organize more items of mail than there are containers present. For this purpose, once the non-sorted items of mail have been loaded into the containers, the pre-sorted items of mail are loaded into the still empty containers or the containers which are becoming empty as a result of being emptied into the depositing receptacles. The delivery points are assigned place numbers in accordance with their order in the respective depositing receptacles, and the pre-sorting operation takes place such that the items of mail which are assigned to the delivery points with the lower place numbers can be separated before the items of mail with the higher place numbers.

In conjunction with the pre-sorted items of mail included, it is, moreover, advantageous for the non-sorted items of mail of the current address area to be loaded into empty circulating containers even when items of mail of the preceding address area are still located in containers, i.e. this emptying operation has not yet been completed. This makes possible a further increase in the output capacity during the sorting operation since the situation where containers stand empty during the sorting operation is largely avoided.

An exemplary embodiment of the invention is explained in more detail hereinbelow with reference to the drawings.

5 In the drawings:

figure 1 shows a schematic illustration of the circulating containers being loaded, without overlapping operation, according to the prior art;

figure 2 shows a schematic illustration of the containers being emptied into depositing receptacles, without overlapping operation, according to the prior art;

figure 3 shows the time sequence of the organizing sorting, without overlapping operation, according to the prior art;

figure 4 shows the time sequence of the organizing sorting of items of mail of a plurality of address areas into two depositing-receptacle groups, without overlapping operation;

figure 5 shows the time sequence of the organizing sorting of items of mail of a plurality of address areas into two depositing-receptacle groups, with overlapping operation;

figure 6 shows the time sequence of the organizing sorting with pre-sorted items of mail, without overlapping operation, according to the prior art;

figure 7 shows the time sequence of the organizing sorting, with pre-sorted items of mail, into

two depositing-receptacle groups, with overlapping operation;

figure 8 shows the sequence of the organizing process with pre-sorted items of mail in a number of circulating cycles of the containers.

According to figures 1 and 2, the items of mail are sorted in a sorting arrangement having an intermediate store, which comprises containers 1, 4 circulating in a closed loop, and having a series of depositing receptacles 2, the depositing receptacles 2 being envisaged for receiving more than one item of mail 3 in organized fashion, with the result that the number of depositing receptacles 2 can be kept considerably smaller than the number of containers 1, 4. It is, however, the case that a number of circulating cycles of the containers 1, 4 of the intermediate store are necessary in order for all the items of mail 3 to be transferred from the containers 1 into the depositing receptacles 2.

The organizing operation takes place in the following steps:

1. Transporting an addressed item of mail 3 past a reading arrangement into a free container 4 of the circulating intermediate store.
2. Determining the address or suitable information on the item of mail 3.
3. Repeating steps 1 and 2 until all the items of mail 3 are located in each case in one container 1 of the intermediate store.
4. As soon as an item of mail 3 is located above that depositing receptacle 2 into which, with account being taken of the address information read from all the items of mail 3 located in the containers 1, it has to be deposited before all other items of mail in order to produce the desired organized

order, the container 1 is opened and the item of mail 3 is deposited in said depositing receptacle 2.

- 5 5. When all the containers 1 are empty, the items of mail 3 located in the form of sub-stacks 5 in the depositing receptacles 2 are removed therefrom in order and, if appropriate, combined to form one or more stacks.
- 10 6. Repeating steps 1 to 5, if appropriate, for the next address area.

Figure 3 illustrates the time sequence of the abovedescribed process steps for a single address area.

- 15 Introduction = steps 1 to 3
- Destacking = step 4
- Emptying = step 5

20 The assignment between the items of mail 3 which are to be organized and all belong to a defined address area (corresponds to one or more delivery areas) and the depositing receptacles 2 is determined, in a first variant, by groups of addresses (delivery points) being assigned to the depositing receptacles 2, with the result

25 that a depositing receptacle 2 is clearly assigned to each address. The groups of addresses assigned to the individual depositing receptacles 2 correspond in each case to a continuous section of the organized order which is to be produced.

30 As an example, the following organized order of the items of mail 3 is to be produced in accordance with addresses for a single address area:

A-Street 1 → A-Street 3 → A-Street 5 → A-Street 7 →
 B-Lane 8 → B-Lane 7 → B-Lane 6 → B-Lane 5
 35 → B-Lane 3 → B-Lane 2 → A-Street 2 → A-Street 4 →
 A-Street 6 → A-Street 8 → C-Avenue 1 → C-Avenue 2 →

C-Avenue 3 → C-Avenue 4 → C-Avenue 5 → C-Avenue 6 →
C-Avenue 7

Assignment of the addresses to the depositing receptacles:

Depositing Receptacle 1	Depositing Receptacle 2	Depositing Receptacle 3
A-Street 1	B-Lane 6	A-Street 8
A-Street 3	B-Lane 5	C-Avenue 1
A-Street 5	B-Lane 3	C-Avenue 2
A-Street 7	B-Lane 2	C-Avenue 3
B-Lane 8	A-Street 2	C-Avenue 4
B-Lane 7	A-Street 4	C-Avenue 5
	A-Street 6	C-Avenue 6
		C-Avenue 7

- 5 The assignment of the addresses to the depositing
receptacles 2 is not made dependent on how many and/or
on what kind of items of mail 3 which are to be
organized are actually present for the individual
addresses. Rather, this assignment has been defined
10 before the addresses of the items of mail 3 which are
to be organized are known.

The advantage of such a fixed assignment consists in
that all the items of mail which are intended for a
certain delivery zone are always located in one
15 depositing receptacle 2, and these items of mail are to
be kept separate from the items of mail for other
delivery zones (the items of mail are not combined to
form an overall stack).

As an alternative to this, it is possible, for the
20 purpose of optimizing the filling of the depositing
receptacles 2, for the assignment between the items of
mail 3 which are to be organized and the depositing
receptacles 2 to be defined only once all the items of
mail are located in the containers 1 of the
25 intermediate store.

This defining operation takes place either such that,
at the end, an essentially equal number of items of

mail 3 is located in each of the depositing receptacles 2 or that the mail stacks 7 which are located in each of the depositing receptacles 2 at the end are of essentially equal thickness.

- 5 The advantage of such flexible assignment consists in that the risk of depositing receptacles 2 overflowing is reduced, or in that only as many depositing receptacles 2 of the sorting arrangement are occupied as are necessary for the given quantity of items of mail 3 which are to be
- 10 organized without said depositing receptacles overflowing. Since the depositing receptacles 2 are subdivided into

two essentially equally sized groups, which are each assigned a separate address area for which items of mail 3 are to be organized, it is simultaneously possible for items of mail 3 for a given address area to be deposited in the depositing receptacles 2 of one group while items of mail 3 are still located in the depositing receptacles 2 of the other group, which latter items of mail were previously deposited therein and can now be removed.

The advantage consists in that an operator can keep up with the sorting arrangement in that, rather than having to take place at the same time as the operation of filling the intermediate store, it is possible to utilize, for the operation of emptying the depositing receptacles 2, that period of time during which the items of mail are transferred (automatically) from the containers 1 of the intermediate store into the depositing receptacles 2.

Figure 4 illustrates the corresponding time sequence of the process steps for the case where items of mail for a number of address areas are to be organized one after the other.

This process can be carried out more effectively in terms of time if steps 1 to 3 (filling the intermediate store) for the items of mail of the current address area are carried out while items of mail of the preceding address area are still located in the containers 1 and are being transported into the depositing receptacles 2. It is a prerequisite for the advantageous use of this variant that the sorting arrangement allows the intermediate store to be filled continuously, in a manner in which it essentially keeps up with the emptying of the intermediate store, even when an essentially variable number of (occupied) containers 2 is located between two (empty) containers 2 which are to be filled one after the other, e.g. an empty compartment is followed by 5 occupied

compartments, this is followed by an empty compartment, the latter is followed by 8 occupied compartments, this is followed by an empty compartment, the latter is followed by 2 occupied compartments etc. This makes it possible to organize considerably more items of mail in the same period of time.

Figure 5 illustrates the corresponding time sequence of the process steps for this purpose.

In the case of a fixed depositing-receptacle/address assignment, it is possible for those items of mail which are already present in an organized state to be advantageously combined with those which have still to be organized, with the result that it is possible to introduce into the organized order which is to be produced more items of mail than the sorting arrangement has storage spaces (containers).

For the efficiency of this process, observing the following conditions is essential:

Only items of mail which are intended for the same previously defined address area (corresponds to one or more delivery areas) are processed together.

- Within each group of addresses which are assigned to a depositing receptacle in each case, the addresses (delivery points) are numbered continuously (fictitious place number), beginning at 1, in accordance with the organized order which is to be produced.

- The organized order in which the organized quantity of items of mail have to be present has all the addresses (delivery points) with a lower place number preceding the addresses (delivery points) with a higher place number.

According to the previous example, the organized order of the addresses for a single address area which is to be produced is as follows:

A-Street 1 → A-Street 3 → A-Street 5 → A-Street 7 →
B-Lane 8 → B-Lane 7 → B-Lane 6 →

B-Lane 5 → B-Lane 3 → B-Lane 2 → A-Street 2 → A-
Street 4 → A-Street 6 A-Street 8 →

5 C-Avenue 1 → C-Avenue 2 → C-Avenue 3 → C-Avenue 4 →
C-Avenue 5 → C-Avenue 6 → C-Avenue 7

Assignment of the addresses to the depositing
receptacles and fictitious place numbers:

Fictitious place number	Stacking compartment 1	Stacking compartment 2	Stacking compartment 3
1	A-Street 1	B-Lane 6	A-Street 8
2	A-Street 3	B-Lane 5	C-Avenue 1
3	A-Street 5	B-Lane 3	C-Avenue 2
4	A-Street 7	B-Lane 2	C-Avenue 3
5	B-Lane 8	A-Street 2	C-Avenue 4
6	B-Lane 7	A-Street 4	C-Avenue 5
7		A-Street 6	C-Avenue 6
8			C-Avenue 7

10

Example of the organized order in which an organized
quantity of the items of mail has to be present:

A-Street 1 → A-Street 8 → C-Avenue 1 → A-Street 3 →
B-Lane 5

15 → A-Street 5 → C-Avenue 3 →

A-Street 2 → C-Avenue 5

The organizing operation then contains the following
steps:

1. Transporting an addressed item of mail 3 from the
20 quantity of non-organized items of mail past a
reading arrangement into a free container 4 of the
sorting arrangement
2. Determining the address or suitable information on
the item of mail 3

3. Repeating steps 1 and 2 until all the non-organized items of mail 3 are located in each case in one container 1 of the intermediate store.
4. Transporting an addressed item of mail 3 from the quantity of organized items of mail past the reading arrangement into a free container 4 of the sorting arrangement (beginning with the item of mail which has the lowest place number).
5. Determining the address or suitable information on the item of mail 3.
6. Repeating steps 4 and 5 until all the organized items of mail 3 have passed the sorting arrangement.
7. (parallel to 6.) As soon as a first item of mail 3 is located above that depositing receptacle 2 in which, with account being taken of the address information read from all the items of mail 3 located in the containers 1, it should be deposited before all other items of mail in order to produce the desired organized order and, for the case where this item of mail 3 does not belong to the quantity of organized items of mail, at least a second item of mail is located in one of the containers 1, this being distinguished in that it belongs to the quantity of organized items of mail and is intended for said depositing receptacle 2, the container 1 in which the first item of mail 3 is located is opened and the item of mail 3 is deposited in said depositing receptacle 2.
8. When all the containers 1 are empty, the items of mail 3 located in the form of sub-stacks 5 in the depositing receptacles 2 are removed therefrom in order and, if appropriate, combined to form one or more stacks.
9. Repeating steps 1 to 8, if appropriate, for the next address area.

Figure 6 shows the corresponding time sequence of these process steps with the following assignments:

- Introduction = steps 1 to 3
- Pre-sorted introduction = steps 4 to 6
- 5 Destacking = step 7
- Emptying = step 8

It is also possible here for the organizing operation with inclusion of pre-sorted items of mail for the current address area to be carried out while items of mail of the previous address area are still located in the containers 1 and are being conveyed into the depositing receptacles 2. This likewise increases the throughput and/or the time available for removing items of mail.

15 Figure 7 illustrates the corresponding time sequence, in which

- Introduction = steps 1 to 3
- Pre-sorted introduction = steps 4 to 6
- Destacking = step 7
- 20 Emptying = step 8

An actual sorting run proceeds as follows:

Order of the non-organized items of mail (21 items) in the containers of the intermediate store:

25 C2-A6-B3-A1-C5-B3-A2-B8-C7-B6-A5-C4-B7-A8-C1-B8-B5-C6-A3-C3-A7

Order of the organized items of mail (9 items, lower-case letters indicate that the items of mail belong to the quantity of organized items of mail):

a1-a8-c1-a3-b5-a5-c3-a2-c5

30 The following organized items of mail (3 items) are filled into containers of the intermediate store following the non-organized items of mail:

a1-a8-c1

35 The items of mail are then conveyed into the depositing receptacles.

6 items of mail are deposited during the 1st circulating cycle of the containers (figure 8a). The 6 containers which are becoming empty here are filled

again with 6 organized items of mail during the same circulating cycle.

5 items of mail are then deposited during the 2nd circulating cycle of the pockets (figure 8b).

- 5 Since there are no longer any organized items of mail present to be filled into the containers, it is only the operation of sorting into the depositing receptacles which takes place in the next circulating cycles, without the containers being refilled (the
10 containers which remain empty are indicated by **).
Then, in the correct order, 8 items of mail are
conveyed into the depositing receptacles during the 3rd circulating cycle, 6 items of mail are conveyed into
the depositing receptacles during the 4th circulating
15 cycle, 4 items of mail are conveyed into the depositing receptacles during the 5th circulating cycle and the rest of the items of mail are conveyed into the depositing receptacles during the 6th circulating cycle (figures 8c-8f).

Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Einrichtung und Verfahren zum Ordnen von flachen Sendungen

Einrichtung und Verfahren zum Ordnen von flachen Sendungen

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)

☐ hier beigelegt ist.

☒ am 07.08.2000 als

PCT internationale Anmeldung

PCT Anwendungsnummer PCT/DE00/02627

eingereicht wurde und am _____

abgeändert wurde (falls tatsächlich abgeändert).

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☐ is attached hereto.

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PCT Application No. PCT/DE00/02627

and was amended on _____

(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

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Prior foreign applications
Priorität beansprucht

Priority Claimed

199 43 362.3

DE

10.09.1999



(Number)
(Nummer)

(Country)
(Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

Yes
Ja

No
Nein

(Number)
(Nummer)

(Country)
(Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

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Yes
Ja

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Yes
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(Application Serial No.)
(Anmeldeseriennummer)

07.08.2000

(Filing Date D, M, Y)
(Anmeldedatum T, M, J)

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(Status)
(patentiert, anhängig,
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pending

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abandoned)

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(Anmeldeseriennummer)

(Filing Date D,M,Y)
(Anmeldedatum T, M; J)

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German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

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(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

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